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(21) Application number: **09171126**(22) Date of filing: **11 . 06 . 97**(71) Applicant: **JAPAN STORAGE BATTERY CO LTD**

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(54) LITHIUM ION SECONDARY BATTERY**(57) Abstract:**

PROBLEM TO BE SOLVED: To provide a battery, which has high capacity and excellent cycle characteristic, at a low cost by using the positive electrode active material of the mixture of three kinds of lithium nickel compound oxide, lithium cobalt compound oxide and lithium manganese compound oxide.

SOLUTION: Lithium nickel compound oxide is desirably included in the mixture of three kinds of material at 25 wt.% or more on a point of safety. Total content of lithium nickel compound oxide and lithium cobalt compound oxide is desirably set at 20 wt.% or more so as

to improve the large current discharging capacity. In the case where the mean grain diameter of the lithium manganese compound oxide is expressed with (dm), and mean grain diameter close to the (dm) among each mean grain diameter of the lithium manganese compound oxide and the lithium cobalt compound oxide is expressed with (dnc), a desirable difference between (dm) and (dnc) is 0.5 μm or more. Fine charge is performed and quantity of the binder is reduced by giving a difference of grain diameter. With this structure, a positive electrode with a good balance of capacity, cycle characteristic and cost can be obtained.

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TI リチウム二次電池用 LiMn_2O_4 電極の構造的安定性

ET Structural stability of LiMn_2O_4 electrodes for lithium batteries.

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AB LiMn_2O_4 電極の構造的安定性を, プロセスや組成, $\text{Li}-\text{Mn}-\text{O}$ 相図, 電気化学的挙動に関して論じた。特に, Mn^{2+} イオンがスピネル構造の四面体位を

部分的に占めるリチウム-マンガン-酸化物スピネル生成物を形成するプロセス条件に注目した。電子ビームおよびRFマグネトロンスパッタリング薄膜電極の電気化学的挙動は, 5.3 Vへの初期充電中での部分的逆 $\text{Li}_{1-x}\text{Mn}_2\text{O}_4$ スピネル構造の存在を示した。

CC YB04030K (621.355)

KW 二次電池; リチウム; 酸化物; リチウム化合物; マンガン化合物; スピネル型結晶; 膜電極; 蒸着膜; 電子ビーム蒸着; マグネトロンスパッタリング; 電気化学的挙動; リチウム二次電池

FT [電池活物質]